

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS:

1. (Canceled)
2. (Currently Amended) A blood pump system as set forth in claim [1] 19, comprising no direct flow rate detecting means.
3. (Canceled)
4. (Canceled)
5. (Canceled)
6. (Canceled)
7. (Canceled)
8. (Canceled)
9. (Canceled)

10. (Canceled)

11. (Canceled)

12. (Canceled)

13. (Canceled)

14. (Canceled)

15. (Currently Amended) A blood pump system as set forth in claim [1] 19, comprising alarm means for producing an alarm which is operated when it is determined by said backflow detecting function means that a backflow is present.

16. (Currently Amended) A blood pump system as set forth in claim [1] 19, comprising a rotational speed control function means for increasing the rotational speed of said rotor when it is determined by said backflow detecting function means that a backflow is present.

17. (Currently Amended) A blood pump system as set forth in claim [1] 19, wherein said rotor is an impeller for pumping blood by a centrifugal force upon rotation thereof.

18. (Currently Amended) A blood pump system as set forth in claim [1] 19, comprising said housing having said inlet port and said outlet port, a centrifugal pump section having an impeller comprising a magnetic member therein and being rotated in said housing so as to pump blood by a centrifugal force upon rotation thereof, a the rotor comprising a magnet for attracting said magnetic member of said impeller of said centrifugal pump section, an impeller rotational torque generating section comprising a the motor for rotating said rotor, and an impeller position control section comprising an electromagnet, wherein said impeller is rotated in said housing without any contact.

19. (New) A blood pump system which comprises:
a housing having an inlet port and an outlet port;
a rotor rotated in said housing for pumping blood;
a motor for rotating said rotor;
motor current measuring means for measuring motor current;
backflow detecting means for detecting a backflow of blood by use of the motor current value continuously measured by said motor current measuring means;
and

wherein said backflow detecting means comprises motor current threshold storing or calculating means for storing or calculating a motor current threshold varying according to a rotational speed of said rotor, and a backflow generation determining means for determining, when a period of time when said motor current value measured by said motor current measuring means is not more than said motor

current threshold at the rotational speed has reached or exceeded a predetermined period of time, that a backflow is present.

20. (New) A blood pump system which comprises:
a housing having an inlet port and an outlet port;
a rotor rotated in said housing for pumping blood;
a motor for rotating said rotor;
motor current measuring means for measuring motor current;
backflow detecting means for detecting a backflow of blood by use of the motor current value continuously measured by said motor current measuring means;
and

wherein said backflow detecting means comprises a motor current threshold storing or calculating means for storing or calculating a motor current threshold varying according to a rotational speed of said rotor, and a backflow generation determining means for determining, when an average over a predetermined period of time of said motor current value measured by said motor current measuring means has been lowered to or below said motor current threshold or when a condition where said average is not more than said motor current threshold at the rotational speed has been generated continuously or intermittently, that a backflow is present.

21. (New) A blood pump system which comprises:
a housing having an inlet port and an outlet port;
a rotor rotated in said housing for pumping blood;

a motor for rotating said rotor;

motor current measuring means for measuring motor current;

backflow detecting means for detecting a backflow of blood by use of a motor current value continuously measured by said motor current measuring means; and

wherein said backflow generation detecting means comprises motor current threshold storing or calculating means for storing or calculating a motor current threshold varying according to a rotational speed of said rotor, and a backflow generation determining means for detecting a sequential motor current lower limit peak value from said motor current value sequentially measured by said motor current measuring means and for determining, when said motor current lower limit peak value has been lowered to or below said motor current threshold at the rotational speed or when the condition where said motor current lower limit peak value is not more than said motor current threshold at the rotational speed has continued, that a backflow is present.

22. (New) A blood pump system which comprises:

a housing having an inlet port and an outlet port;

a rotor rotated in said housing for pumping blood;

a motor for rotating said rotor;

motor current measuring means for measuring motor current;

backflow detecting means for detecting a backflow of blood by use of a motor current value continuously measured by said motor current measuring means; and

wherein said backflow detecting means comprises a motor current threshold storing or calculating means for storing or calculating a motor current threshold

varying according to a rotational speed of said rotor, and a backflow generation determining means for detecting a sequential motor current lower limit peak value from said motor current sequentially measured by said motor current measuring means and for determining, when an average over a predetermined period of said motor current lower limit peak value has been lowered to or below said motor current threshold at said rotational speed or when the condition where said average is not more than said motor current threshold at said rotational speed has continued, that a backflow is present.

23. (New) A blood pump system which comprises:
a housing having an inlet port and an outlet port;
a rotor rotated in said housing for pumping blood;
a motor for rotating said rotor;
motor current measuring means for measuring motor current;
backflow detecting means for detecting a backflow of blood by use of a motor current value continuously measured by said motor current measuring means; and
wherein said backflow detecting means comprises a motor current derivative calculation means for calculating a derivative by use of the motor current value sequentially measured by said motor current measuring means, and a backflow generation determining means for determining generation of a backflow by use of said derivative calculated by said motor current derivative calculation means.

24. (New) A blood pump system which comprises:
a housing having an inlet portion and an outlet port;

a rotor rotated in said housing for pumping blood;
a motor for rotating said rotor;
motor current measuring means for measuring motor current;
backflow detecting means for detecting a backflow of blood by use of a motor current value continuously measured by said motor current measuring means; and
wherein said backflow detecting means comprises a motor current derivative calculation means for calculating a derivative by use of the motor current value sequentially measured by said motor current measuring means, and a backflow generation determining means for determining when a condition where the generation of zero points of the derivative calculated by said motor current derivative calculation means in a predetermined period of time is increased has continued, that a backflow is present.

25. (New) A blood pump system which comprises:
a housing having an inlet port and an outlet port;
a rotor rotated in said housing for pumping blood;
a motor for rotating said rotor;
motor current measuring means for measuring motor current;
backflow detecting means for detecting a backflow of blood by use of a motor current value continuously measured by said motor current measuring means; and
wherein said backflow detecting means comprises a motor current derivative calculation means for calculating a derivative by use of the motor current value sequentially measured by said motor current measuring means, and a backflow generation determining means for determining, when a period of generation of zero

points of said derivative calculated by said motor current derivative calculating means in a predetermined period of time has become greater than a frequency between motor current upper limit peaks or when this condition has continued, that a backflow is present.

26. (New) A blood pump system which comprises:
a housing having an inlet port and an outlet port;
a rotor rotated in said housing for pumping blood;
a motor for rotating said rotor;
motor current measuring means for measuring motor current;
backflow detecting means for detecting a backflow of blood by use of a motor current value continuously measured by said motor current measuring means; and
wherein said backflow detecting means comprises a motor current derivative calculation means for calculating a derivative by use of the motor current value sequentially measured by said motor current measuring means, and a backflow generation determining means for determining, when a condition where the generation of zero points of the derivative calculated by said motor current derivative calculation means in a predetermined period of time appears repeatedly in shorter periods and longer periods is generated or when said condition has continued, that a backflow is present.

27. (New) A blood pump system which comprises:
a housing having an inlet port and an outlet port;
a rotor rotated in said housing for pumping blood;

a motor for rotating the rotor;

motor current measuring means for measuring motor current;

backflow detecting means for detecting a backflow of blood by use of a motor current value continuously measured by said motor current measuring means; and

wherein said backflow detecting means comprises a motor current derivative calculation means for calculating a derivative by use of the motor current value sequentially measured by said motor current measuring means, derivative threshold storing means for storing a derivative threshold for determination, and a backflow generation determining means for determining when the derivative calculated by the motor current derivative calculation means is within said derivative threshold under predetermined conditions or when a condition where said derivative is within said derivative threshold under predetermined conditions is repeated, that a backflow is present.